

REMARKS

Claims 1-10 and 13-15 are now pending in the application. Claims 11 and 12 have been cancelled. Claims 1-10 were amended. Claims 13-15 were added. The Examiner is respectfully requested to reconsider and withdraw the rejection(s) in view of the amendments and remarks contained herein.

OBJECTIONS

Claim 12 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Although Applicant does not necessarily agree, to expedite prosecution, Applicant cancels Claim 12.

REJECTION UNDER 35 U.S.C. § 102

Claims 1-3 and 8-11 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Ishikawa (U.S. Pat. No. 6,257,685 B1). This rejection is respectfully traversed.

Claim 1 calls for a liquid drop ejecting device including: a liquid drop ejecting head device having a liquid drop ejecting head ejecting a liquid drop, and a storage section storing at least one of record datum indicating whether or not the liquid drop is ejected from the liquid drop ejecting head device; and a controlling device transmitting the record datum and a driving waveform driving the liquid drop ejecting head to the liquid drop ejecting head device.

According to the claimed invention, there is no need to transmit the record datum from the controlling device to the liquid drop ejecting head device during the ejection of

the liquid drop. Thus, it is possible to reduce the record datum transmitted from the controlling device to the liquid drop ejecting head device. Also, the record datum is not rapidly transmitted from the controlling device to the liquid drop ejecting head device during ejection of the liquid drop. Thus, it is possible to prevent an erroneous conversion of the datum and the radiation noise which is caused by noise during the transmission of the datum.

For illustrative purposes only as the claimed invention is directed toward numerous embodiments, an explanation is now provided with reference to Fig. 2 of the application.

The liquid drop ejecting device of the claimed invention has a head 10 (liquid drop ejecting head device) and a controlling device 11. The head 10 includes a liquid drop ejecting head 28 and a head driving circuit 29 having a memory controlling circuit 34 (storage controlling section) and a memory 35 (storage section). The controlling device 11 includes an interface 21, a RAM 22, a ROM 23, a controlling section 24, an oscillating circuit 25, a driving signal generating section 26, and an interface 27. Therefore, the memory 35 is not provided in the controlling device 11, but is provided in the head 10.

According to the claimed invention, since the memory 35 is provided in the head 10, it is possible to store an ejection datum SI in the memory 35. The ejection datum SI is transmitted from the controlling device 11 to the memory 35 of the head driving circuit 29 of the head 10 in advance so as to be stored in the memory 35 such that the ejection datum SI is read out of the memory 35 when the liquid drop is ejected, and thus, the ejection of the liquid drop by the liquid drop ejecting head 28 is controlled.

By the claimed arrangement, it is possible to realize the above-described effects of the present invention.

In contrast to the claimed configuration, the ink droplet ejecting method and apparatus of Ishikawa do not contain each and every element of Claim 1.

As shown in Fig. 8 of Ishikawa, a pulse control circuit 186, a charging circuit 182, and a discharge circuit 184 are provided in the controller 625. No storage section corresponding to the memory 35 of the claimed invention exists in the controller 625. Therefore, in the ink droplet ejecting apparatus of Ishikawa, when each ink ejection is performed, pulse generators 120 and 122 must output a driving waveform to the charging circuit 182 and the discharge circuit 184. Even if an amount of the liquid droplets ejected from the nozzles is increased or if a periodicity ink ejection is repeated, the pulse generators 120 and 122 must output a driving waveform to the charging circuit 182 and the discharge circuit 184.

According to the ink droplet ejecting apparatus of Ishikawa, since no storage section exists in the ink droplet ejecting apparatus, there are problems. For example, when it takes a longer time to transmit the various data (ejection datum) during the ejecting of the liquid drop than the time for ejecting the liquid drop, the liquid drop is not ejected from nozzles, there is a period in which the liquid drop ejecting head stops its operation, and manufacturing efficiency decreases. To prevent such a problem, if the speed for transmitting the datum increases, there are problems in that the datum may be erroneously converted or radiation noise may increase.

Claim 1 calls for a liquid drop ejecting head device having a storage section storing at least one of record datum indicating whether or not the liquid drop is ejected

from the liquid drop ejecting head device. Therefore, there is no need to transmit the record datum from the controlling device to the liquid drop ejecting head device during ejection of the liquid drop. In addition, it is possible to reduce the record datum being transmitted from the controlling device to the liquid drop ejecting head device. Also, the record datum is not rapidly transmitted from the controlling device to the liquid drop ejecting head device during ejection of the liquid drop. Thus, it is possible to prevent an erroneous conversion of the datum and radiation noise which is caused by noise during transmission of the datum.

In view of the foregoing, it can be appreciated that Ishikawa does not disclose each feature recited in claim 1. In addition, none of the references disclose, teach, or suggest the invention as set forth in Claim 1.

In addition, in the liquid drop ejecting head device according to amended Claim 8, the liquid drop ejecting head device includes the above-described storage section.

In addition, in the method for ejecting a liquid drop according to amended Claim 9, the method for ejecting a liquid drop, includes the above-described storage section.

In addition, the method for manufacturing a device according to new Claim 13 includes the using of the liquid drop ejecting device according to amended Claim 1.

In addition, the method for manufacturing a device according to new Claim 15 includes the using of the method for ejecting a liquid drop according to amended Claim 9.

Therefore, Ishikawa does not disclose the features of Claims 8, 9, 13 and 15 of the present invention. In addition, none of the references disclose, teach, or suggest the present invention as set forth in Claims 8, 9, 13 and 15.

REJECTION UNDER 35 U.S.C. § 103

Claims 4-7 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ishikawa (U.S. Pat. No. 6,257,685 B1) in view of Igarashi (U.S. Pat. Pub. No. 2005/0078134 A1). This rejection is respectfully traversed.

The liquid drop ejecting device according to amended claim 4 is dependent on the amended claim 1. In the liquid drop ejecting device according to amended claim 4, the liquid drop ejecting head device is provided in the liquid drop ejecting device so as to be detachable therefrom.

According to the present invention, it is possible to realize the above-described effects of the amended claim 1 of the present invention, and it is possible to employ a method in which a plurality of liquid drop ejecting head devices having a storage section in which a variety of different record data are stored are prepared in advance so as to exchange the liquid drop ejecting head device according to the manufacturing step. By employing such a method, it is not necessary to transmit the record datum from the controlling device to the liquid drop ejecting head device in the controlling device before the liquid drop is ejected; thus, it is possible to improve manufacturing efficiency.

In the liquid drop ejecting device according to amended claim 5, the liquid drop ejecting device includes: a liquid drop ejecting head device having a liquid drop ejecting head ejecting a liquid drop, a detachable storage section storing at least one of record datum indicating whether or not the liquid drop is ejected from the liquid drop ejecting head device, and a storage controlling section reading out at least one of the record datum from the detachable storage section and/or writing at least one of the record

datum to the detachable storage section; and a controlling device transmitting the record datum and a driving waveform driving the liquid drop ejecting head to the liquid drop ejecting head device.

According to the present invention, it is possible to realize the above-described effects of the amended claim 1 of the present invention, and it is possible to eject the liquid drop according to the variety of the record data only by exchanging the storage section. It is not necessary to transmit the record datum from the controlling device to the liquid drop ejecting head device before the liquid drop is ejected by preparing a plurality of storage sections having different record data in advance so as to exchange the storage section according to the manufacturing step. Thus, it is possible to improve manufacturing efficiency.

In contrast to the above, the printer of Igarashi does not disclose the features of the amended claims 4 and 5 of the present invention.

As shown in Fig. 1 of Igarashi, there is an ink ejection unit 20 having a head 21 and a head driver 22. Neither the head 21 nor the head driver 22 has a storage section corresponding to the memory 35 of the claimed invention. Therefore, with the printer of Igarashi, when each ink ejection is performed, the CPU 61 must output driving waveforms to the head 21 and the head driver 22. Even if an amount of the liquid droplets ejected from the nozzles is increased or if a periodicity ink ejection is repeated, the CPU 61 must output a driving waveform to the head 21 and the head driver 22.

According to the printer of Igarashi, since there is no storage section in the printer, there are the same problems as the ink droplet ejecting apparatus of Ishikawa.

In contrast, amended claim 4 (dependent on amended claim 1) calls for a liquid drop ejecting head device having a storage section storing at least one of record datum indicating whether or not the liquid drop is ejected from the liquid drop ejecting head device. Therefore, it is possible to realize the above-described effects of the present invention in comparison with Igarashi.

Furthermore, amended claim 5 calls for a detachable storage section and the storage controlling section. Therefore, it is possible to realize the above-described effects of the present invention in comparison with Igarashi.

Therefore, Igarashi does not disclose the features of claims 4 and 5 of the present invention. In addition, none of the references disclose, teach, or suggest the present invention as set forth in claims 4 and 5.

In addition, the method for manufacturing a device according to new claim 14 includes using the liquid drop ejecting device according to amended claim 5.

Therefore, Igarashi does not disclose the feature of claim 14 of the present invention. In addition, none of the references disclose, teach, or suggest the present invention as set forth in claim 14.

Accordingly, the present invention according to amended claims 1 to 15 is not anticipated by or render obvious in view of Ishikawa and Igarashi, and claims 1 to 15 should be allowed.


CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests

that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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